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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

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Mary Ann Copas, Secretary

In the Application of Ernst Michael Winter et al

Ser.No.: 09/319,142

Filed: April 23, 2001 (CPA)
May 28, 1999 (US Nat'l Stage)
July 29, 1997 (371 Date)
September 23, 1998 (Int'l Filing Date)

For: GEMSTONE

Art Unit: 1772

Examiner: Alicia Ann Chevalier

Assistant Commissioner for Patents
Washington, DC 20231

APPELLANTS' APPEAL BRIEF

Dear Sir:

Pursuant to 37 CFR 1.192, Appellants hereby file an Appeal Brief in the above-identified application. This Appeal Brief is accompanied by the requisite fee set forth in 37 CFR 1.17(f).

(1) Real Party in Interest

The real party in interest is Winter CVD Technik GmbH, Hamburg, Germany.

(2) Relat d Appeals and Interferences

There are no appeals or interferences that will directly affect or be directly affected by or have a bearing on the Board's decision in the pending Appeal.

(3) Status of Claims

Claims 16-31 are pending in the application, and have all been finally rejected.

(4) Status of Amendments

In response to the Final Rejection dated November 29, 2001, an amendment was filed with a Certificate of Mailing on February 12, 2002, in which claim 16 was amended to address a rejection under 35 U.S.C. 112, second paragraph.

(5) Summary of the Invention

As set forth in the specification on pages 5-7 and as defined in independent claim 16, the present invention relates to synthetic gemstones from precious stone layers by vapor phase deposition on large surface areas. Unlike prior art synthetic gemstones, the gemstones of the present invention have an unusually thin layer, which, despite "unfavorable" dimensions compared to known gemstones, provide an attractive and decorative appearance.

The thrust of the present invention is that an attractive gemstone can be produced by vapor phase deposition of a very thin layer of a precious stone over a large surface area, specifically, a support. However, due to the thinness of the layers, the layers are not suited for further machining (i.e., polishing and grinding) as a jewelry stone once deposited.

Rather, the present invention provides that during the formation of the gemstone, a product is produced that is already suited for use as a jewelry stone.

This goal is accomplished by providing a support, onto which the gemstone layer is deposited, and which has a plurality of pyramid-shaped depressions.

This support surface with the pyramid-shaped depressions need not be dimensioned as a jewelry stone. From a support surface having a large surface area and deposited with the thin vapor deposition layer, many sections can be separated off and shaped to fit a piece of jewelry, such as a ring. Thus, the vapor deposition layer is so firmly bonded to the support that it cannot be dislodged or displaced when the support is divided for creating individual pieces for jewelry.

In order for the precious stone layer, especially diamond layer, of the inventive gemstone to have the required brilliance, its underside that is resting on a support, for example a silicon wafer, must be embodied such that it will produce a reflection of most of the incident light. This can be achieved by a respective pre-treatment of the surface of the silicon wafer to be coated. According to this pre-treatment, the silicon wafer has the required shape as a negative matrix so that the backside or underside of the diamond layer to be formed will have the respective positive shape. As a support or base for such artificially produced diamond layers, silicon wafers are especially suitable but also such materials as precious metals, tungsten, molybdenum, or hard metals which can be coated easily with diamond and at whose surface a structure as required can be produced.

The structure in the support to be coated is achieved by cutting a certain profile, by electrolytic means or, especially in the case of silicon wafers, by chemical or plasma-technological means by etching. It is possible to employ isotropic as well as anisotropic methods.

The edge area of the support of the gemstone layer can be provided with other pyramid angles than the center portion. However, it is also possible to provide the reflecting surfaces (facets) at the underside of the layer with different angles. In this manner, the brilliance and the fire can be adjusted independently from one another. The angles of the facets can be selected such that the light in the gemstone layer is reflected multiple times so that a great diffraction of the spectral colors can be achieved.

It is easiest to provide with a single etching action on the entire surface of the support the same angle, having, for example, a pyramid opening angle of 109°. This angle can be achieved easily by etching processes. Before etching is carried out, the surface of the support can be subjected to a laser action in order to provide the desired geometry.

In a simple pyramid shape, the light can also be refracted by providing a mirror layer on the backside or underside of the vapor phase precious stone, especially a CVD diamond, in the form of a gold or titanium layer. Important in this context is the directed cooperation of the crystal orientation of the precious stone layer and the direction of the etching action in order to provide an optimal optical effect. In a polycrystalline artificial diamond layer, for example, produced by a CVD method, in contrast to a single crystal diamond crystal grain boundaries are present which must be taken into consideration as additional refracting areas having a different refractive index. This has the consequence that the grain boundaries advantageously must be aligned with respect to their structure, for example in a column-like arrangement, in order to provide a positive effect on brilliance and fire. In

any case, the effect of the grain boundary must be taken into consideration for the optical effect.

In order to approximate as closely as possible the brilliance and the fire of single crystal brilliants, an octahedron shape of the surface of the artificial diamond layer is advantageous which can be cut subsequently to its production. The angles at the underside must be matched to the changed exit ratios. These carriers, having a precious stone layer produced by vapor phase deposition, can be used as gemstones in the conventional manner, for example can be mounted on a metal body of a piece of jewelry.

The surface of the support or substrate carrying the deposited precious stone layer must not be planar. For example, it can be convex in order to provide artificial gemstones in the shape of a cabochon or button.

(6) Issues

Whether claims 16-18, 20, 22-27, and 29-31 are unpatentable over U.S. Patent No. 5,882,786 to Nassau in view of U.S. Patent No. 2,521,846 to Gregory under 35 U.S.C. 103(a); and whether claims 19, 21, and 28 are unpatentable over Nassau in view of Gregory and in further view of U.S. Patent No. 5,431,028 to Lampert under 35 U.S.C. 103(a).

(7) Grouping of Claims

The rejected claims are as follows:

a) claims 16-31, which stand or fall together.

(8) Argument

The Appellants respectfully submit that the rejection of the claims under 35 U.S.C. 103 cannot be maintained. None of the cited reference combinations even

remotely suggests to the practitioner the use of a support having a large surface area with pyramid-shaped depressions onto which the precious stone layer is applied via vapor phase deposition, as defined in claim 16.

Claim 16 provides further that each of the pyramid-shaped depressions has a pyramid angle formed between adjoining faces of the pyramid-shaped depressions. Claim 16 further includes the limitations that the precious stone layer has an upper surface facing away from the plate-shaped support and an underside having a plurality of pyramid-shaped projections arranged to correspondingly fit a respective one of the pyramid-shaped depressions. Finally, claim 16 also adds that the precious stone layer imparts decorative, light-reflective qualities.

Looking now at the cited references in light of the features of the present invention as defined in main claim 16, Nassau et al specifically discloses a gemstone made from silicon carbide of 0.25 to 5 carats (the size and weight of a natural diamond), which are cut out of a synthetic silicon carbide crystal and subsequently polished like a gemstone (Nassau et al, column 3, lines 8-30). Then, in the traditional manner, the gemstone is placed on a piece of jewelry, for example in a setting of a ring. Since the upper or face surfaces of these gemstones can be damaged during retention in a piece of jewelry, a synthetic diamond layer is added as a protective layer (Nassau et al, column 3, lines 59-67). This diamond layer, however, imparts no decorative characteristics to the silicon carbide gemstone, nor is any intention of imparting decorative features to the gemstone disclosed or implied in Nassau. Any light reflecting or decorative characteristics of the Nassau gemstone are the result of grinding or polishing the silicon carbide stone.

The Gregory patent discloses decorative articles made of glass. These articles are produced by smelting glass in a mold or shape and then cooling the molds to achieve a determined configuration (Gregory, column 4, lines 38-72). Again, smelting and molding glass is not related to the present invention. Further, Gregory neither discloses nor suggests the use of a vapor phase deposition in an extremely thin layer onto a large-surface area support with pyramid-shaped depressions to impart decorative, light reflecting qualities.

The patent to Lampert et al relates to a jewelry stone with synthetic diamond "baguettes". These "baguettes", however, are not precious stones; rather, the stone includes a reflective metal surface with one or more concave indentations formed therein. The indentations have a plurality of faceted reflective surfaces or corrugations, which are intended to reflect light like a natural diamond (Lampert et al, column 1, lines 45-55). Lampert fails to provide or even suggest the plurality of pyramid shaped depressions on a large-surface area support and the application of a precious stone layer onto this support by vapor phase deposition.

Moreover, the present invention provides a drastic improvement over the stones disclosed in the cited references by providing unexpected and surprising results: with a thin surface-shaped synthetic gemstone layer, superior light-reflecting qualities are obtained, especially since the pyramid-shaped depressions are disposed beneath the stone when it is placed on the support.

When viewed in the proposed combinations, the above-cited references would not suggest to the practitioner the present invention, as defined in the appealed claims.

In order for a claim to be rejected for obviousness under 35 U.S.C. 103, "not only must the prior art teach or suggest each element of the claims, the prior art must also suggest combining the elements in the manner contemplated by the claim. See Northern Telecom, Inc., v. Datapoint Corp., 908 F2d 931, 934 (Fed. Cir), cert. denied 111 S. Ct. 296 (1990) and In re Bond, 910 F.2d 831, 834 (Fed. Cir. 1990).

In addition, "to establish *prima facie* obviousness, three criteria must be satisfied. First, there must be some suggestion or motivation to modify or combine the reference teachings. In re Fine, 837 F. 2d 1071, 5 U.S.P.Q. 2d 1596 (Fed. Cir.1988). This teaching or suggestion to make the claimed combination must be found in the prior art and not based on the application disclosure. In re Vack, 947 D.2d 488, 20 U.S.P.Q. 2d 1438 (Fed. Cir). The mere fact that references can be combined or modified does not render the resultant combination obvious, unless the prior art also suggests the desirability of the combination. In re Mills, 916 F.2d 680, 16 U.S. P.Q.2d 1430 (Fed. Cir.). Second, there must be a reasonable expectation of some success. In re Merck & Co., Inc., 800 F.2d 1091, 231 U.S.P.Q. 375 (Fed. Cir. 1986). Third, the prior art references must teach or suggest all of the claim limitations. In re Royka, 490 F.2d 981, 180 U.S.P.Q. 580 (C.C.P.A. 1974).

The cited combination of references does not teach or suggest all of the claim limitations of the main claim 16, nor does the combination contemplate (i.e., "suggest the desirability of") further modifications that would lead to the present invention, as argued above. Therefore, the practitioner simply could not be lead to the present invention from studying these cited patents.

In view of the foregoing discussion, it is respectfully requested that the Honorable Board of Patent Appeals and Interferences overrule the final rejection of

claims 16-31 over the cited art and hold that Appellants' claims 16-31 are allowable over such art.

Respectfully submitted,

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(9) Appendix

Claims 16-31 on appeal are as follows:

16. Gemstone comprising:

a plate-shaped support having a surface with a plurality of pyramid-shaped depressions, each of said pyramid-shaped depressions having a pyramid angle formed between adjoining faces of at least one pyramid-shaped depression; and

a vapor phase deposit layer comprising a precious stone layer applied on said plate-shaped support in a selected orientation, said precious gemstone layer having an upper surface facing away from said plate-shaped support and an underside, said underside having a plurality of pyramid-shaped projections arranged to correspondingly fit a respective one of said pyramid-shaped depressions, whereby said orientation of said vapor phase deposit layer upon said plate-shaped support imparts decorative, light-reflective qualities to said gemstone.

17. Gemstone according to claim 16, wherein said plate-shaped support is a silicon wafer.

18. Gemstone according to claim 17, wherein said silicon wafer has (100) or (111) orientation.

19. Gemstone according to claim 16, wherein said plate-shaped support is comprised of a precious metal.

20. Gemstone according to claim 16, wherein said plate-shaped support is comprised of a metal, said metal having a hardness sufficient to support said precious stone layer upon said plate-shaped support.

21. Gemstone according to claim 16, wherein said plate-shaped support is comprised of a refractive metal.

22. Gemstone according to 16, wherein said pyramid-shaped depressions are produced mechanically.

23. Gemstone according to claim 22, wherein said pyramid-shaped depressions are produced by cutting or stamping.

24. Gemstone according to 16, wherein said pyramid-shaped depressions are produced by etching.

25. Gemstone according to claim 16, wherein each said pyramid angle comprises an angle measurement differing from an angle measurement of any other pyramid angle.

26. Gemstone according to claim 16, wherein each said pyramid angle of said pyramid-shaped depressions includes a pyramid angle measuring approximately 109°.

27. Gemstone according to claim 16, wherein each said precious stone layer (1) includes grain boundaries, said grain boundaries aligned in a column shape.

28. Gemstone according to claim 16, wherein each of said pyramid-shaped depressions has a mirror surface.

29. Gemstone according to claim 16, wherein an upper surface of said precious stone layer facing away form said plate-shaped support (1) is cut.

30. Gemstone according to claim 16, wherein said precious stone layer (1) has a color produced by doping.

31. Gemstone according to claim 16, wherein a surface of said plate-shaped support, on which said precious stone layer (1) is supported, is curved.